

The background of the slide features a sunset sky with a gradient from orange at the horizon to dark blue at the top. Silhouettes of military vehicles, including what appears to be a large tank or armored vehicle on the right and smaller vehicles on the left, are visible against the bright horizon.

Integrating Test & Simulation to Support the Acquisition Process

***Presentation to
Army Test & Evaluation Days II***

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Director, Army Acquisition Corps

16 June 1999



A Promising Future

We Are....

- Maintaining a **Vision** of Where We Are Going
- Transforming to an **Information Age Army**
- **Partnering** With Industry
- Always Focusing on the **Warfighter's Needs**
- Finding Solutions from a **Total Army Perspective**

Window of Opportunity to Embark on a Reasoned, Disciplined, Deliberate Course of Change to Achieve Quantum Leaps in Capabilities



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Army Acquisition Vision

The **World's Best**
force - trained
Total Force
civilians:

- A **values-based**
- An integrated
- Equipped with the best equipment
- Country can
- Able to respond
- **Changing** to new comparable weapons, ...
- tomorrow...and system capability
- the 21st Century while dramatically

*Quality people,
teamwork, and caring
leaders providing
warfighters the
battlefield
technological edge.*

*Beating any adversary
in acquiring*

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reducing ownership

T&E_days- 3





Investment Strategy

Near Term

Mid Term

Far Term

Information Dominance

Overmatch Capabilities

Recapitalization

Essential Science & Technology (Leap-ahead)

Other Requirements

Present - FY05

- Priority on Information Dominance
- Maintain necessary funds to sustain combat capability overmatch
- Focus S&T on leap-ahead technology for mid and far terms
- Fund required recapitalization

FY06-FY15

- Continue emphasis on Information Dominance

FY16-FY25

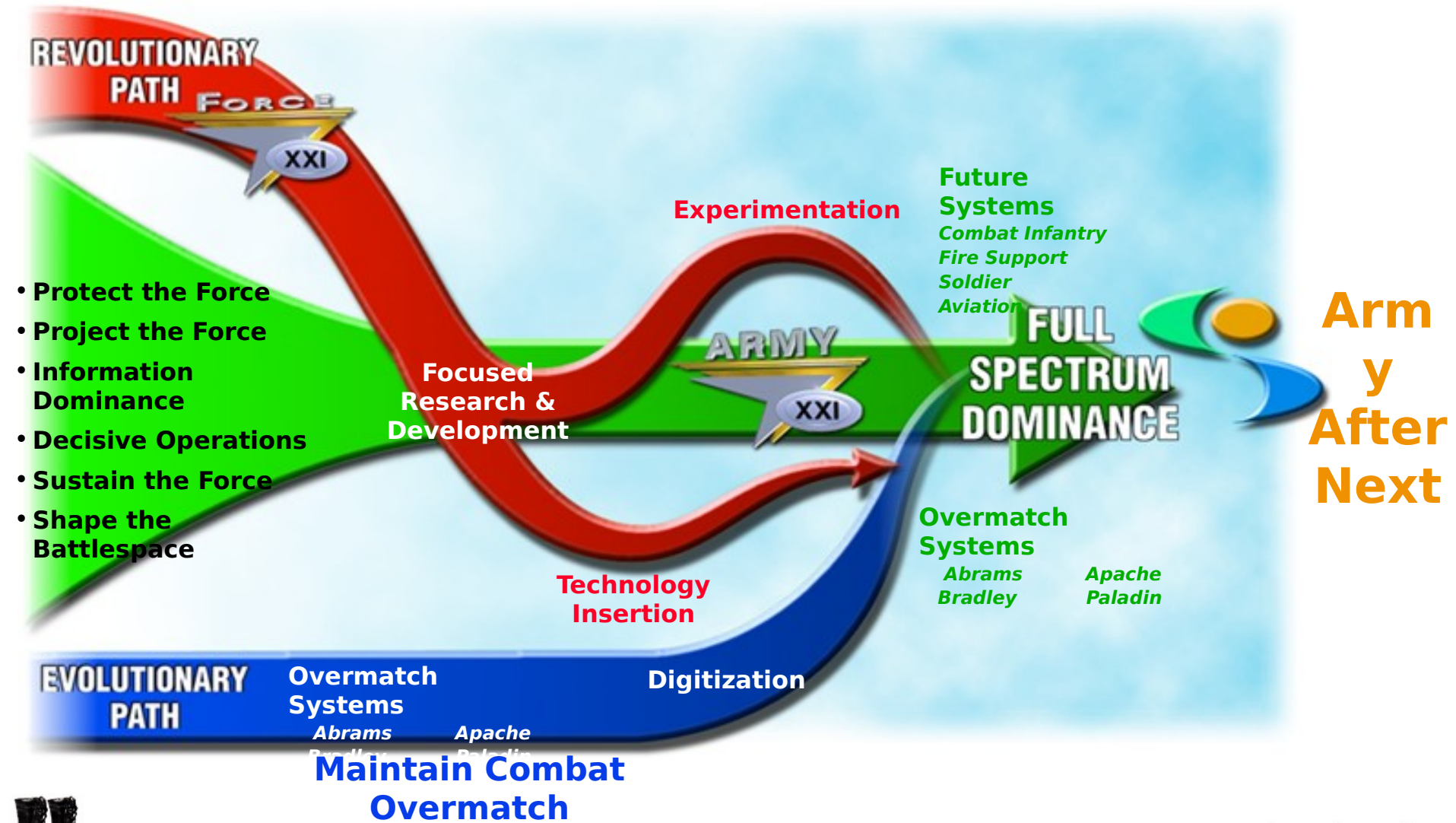
- Sustain Information Dominance
- Combat capabilities and Information Dominance embedded

**Army
After
Next**

**Strategy Leverages Information Technology
Advances and Previous Investment to Maximize
Capabilities in 21st Century**



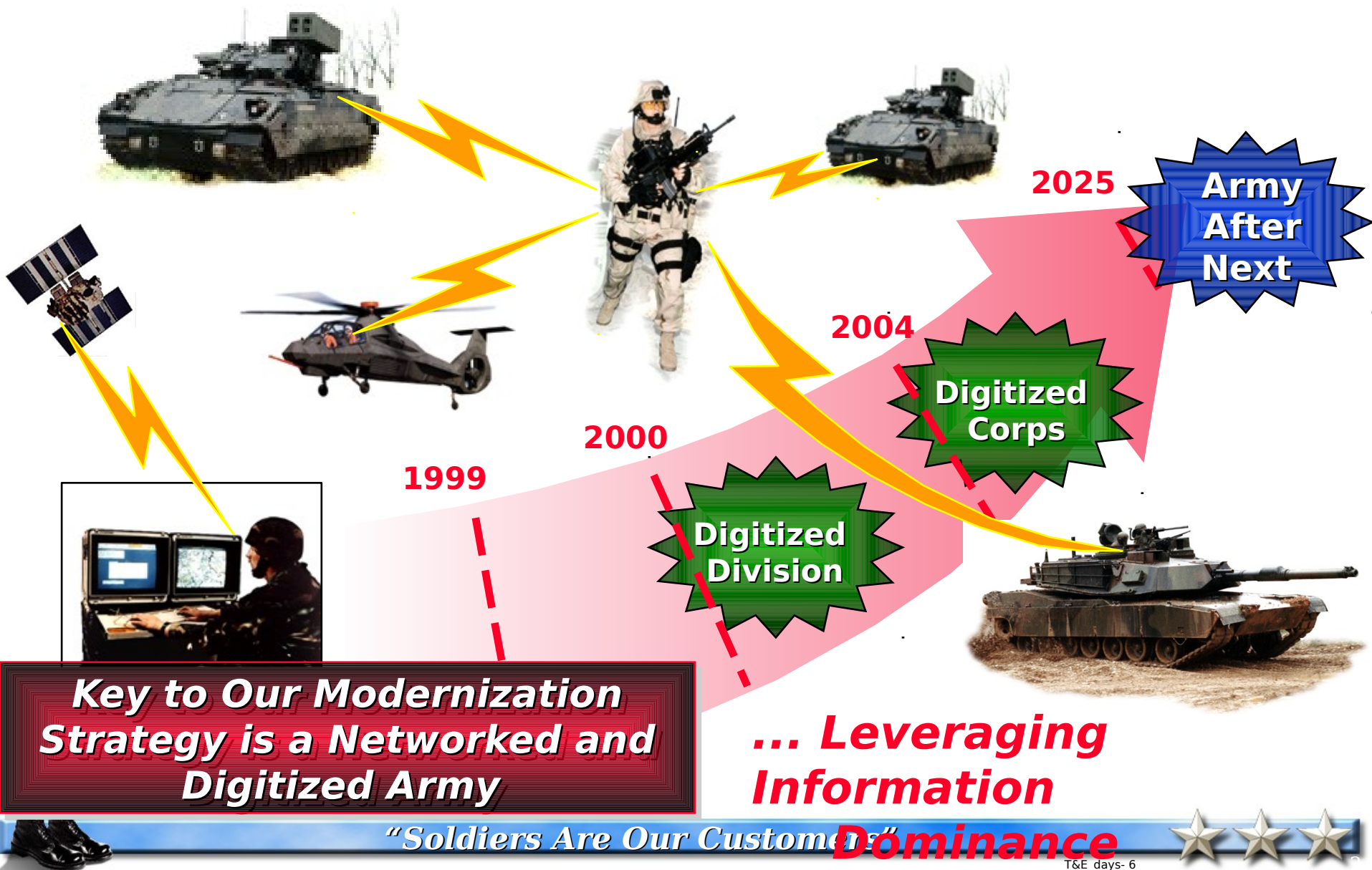
Paths to the Future



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Networking and Digitization





The Resource Challenge

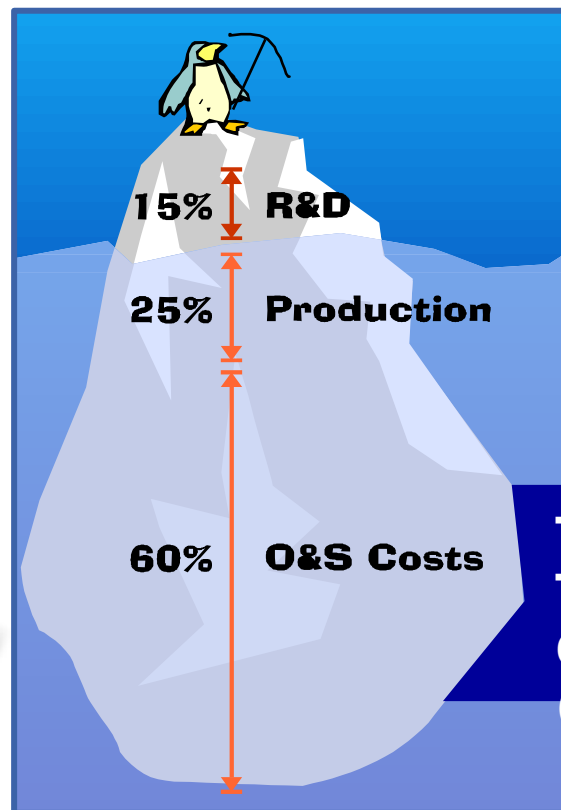
- **Historical Trend Must be Reversed to Protect Future Readiness**
*6% Decrease/Year in Procurement (\$1,149/Soldier Yearly Decrease)**

- **Need Increased TOA to Counter**

- **Extended Service Life of Equipment**
- **Increased O&S Costs**



High O&M Costs Inhibit Future System Development and Recapitalization



Chipping Away at the Iceberg

Traditional Total Cost of Ownership (TCO)

** Note: FY85-99 Constant FY99 Dollars*

Avoid Death Spiral - Reduce Cost of Ownership

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Simulation and Modeling for Acquisition, Requirements and Training (SMART)



The Army's vision for SMART is a process in which we capitalize on Modeling and Simulation (M&S) technology to address the issue of system development and life-cycle costs through the combined efforts of the requirements, training and



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What Will SMART Achieve?

- **Reduced Total Ownership Cost (TOC), Time to Initial Operating Capability (IOC), and Logistics Tail**
- **Increased Supportability, Maintainability, and Military Worth**
- **More Effective, Cost Efficient Training at Individual, Crew, and System Level**

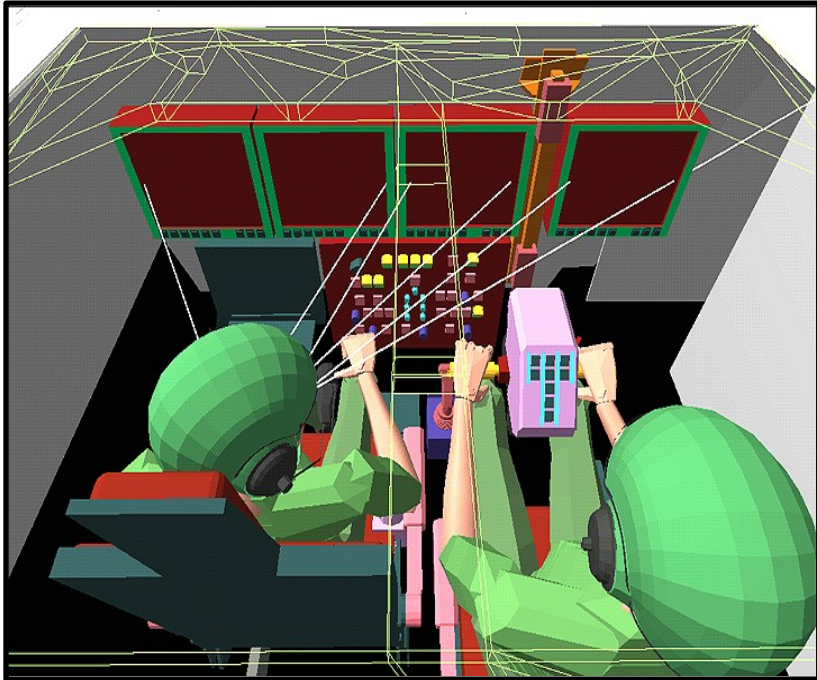


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“SMART” Test and Evaluation



**Design Model for Assessing
MANPRINT for Grizzly Breacher**

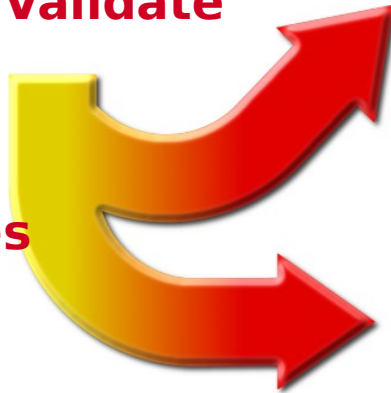
- **Incorporate Long Term Planning for the Right mix of Simulation and Testing**
- **Evolve the Virtual T&E Infrastructure**
- **Conduct “What-if” Drills for Early Development of T&E Plans and Scenarios**
- **Accelerate the Synergies Between the Testing and Training Communities**
- **Ensure T&E Community Participation in all M&S Planning and Accreditation to Facilitate Acceptance**



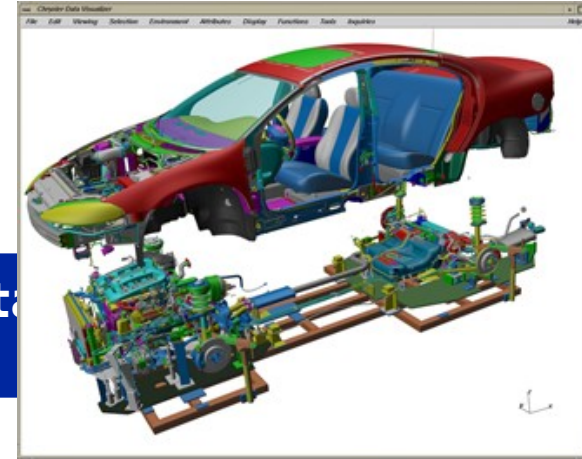


Simulation & Future Experimentation/Testing

- **Must Exploit Simulation to Support Robust Experimentation and Testing**
- **Use Simulation to Validate Systems, not Just Components**
- **Leverage Examples From Industry**



Chrysler's Digital Development



- **Digital Model Assembly (DMA)/ CATIA- 100% Digital Car Design**
- **Concurrent Development of Each Sub-System and its Integration Into Overall Design**

Validate Simulation With Testing

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Common Goal

- **The T&E Goal is to Support Acquisition in Getting a Good, Affordable Capability Into the Hands of our Soldiers**
- **This Goal is Shared Equally by the**
 - **Material Developer**
 - **Combat Developer**
 - **Tester & Evaluator**



***“Our
Ultimate
Customer”***

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What Acquisition PMs Should Do

- **Re-examine Your Acquisition Strategy**
- **Re-examine Your Test Strategy**
- **Use Suitable Legacy Models and Contribute Your Own**
- **Identify Required Changes in Your Program and DoD Process**
- **Develop a Partnership With Industry**



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Test & Evaluation Initiatives

What We are Doing to “Think out of the Box”

• Process

- Integrated Developmental & Operational T&E**
- Consolidated Army Materiel Evaluation**
- Increased use of Joint Warfighting Experiment Process**
- Continued Emphasis on Army Warfighting Experiment Process**
- *Increased use of Modeling and Simulation***



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Potential M&S Pitfalls in T&E

- **Fidelity in the Model not Sufficient, not Having the Proper Characterization of new Capabilities**
- **Models not Being Updated as Program Progresses**
- **Too Much Faith Being Placed in an Unproven Model**



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Common Threads of Success With SMART and T&E

- **Up-Front Investment in a Road Map for use of M&S**
- **Common Program Objectives Shared by Material Developer, Combat Developer, Tester & Evaluator**
- **Model-Test-Model, a Proper mix of Live and Constructive Testing can Provide:**
 - **Model Verification**
 - **Increase Test Sample Size**
 - **An aid to Normalizing Test Baseline**
 - **Means of Performing Sensitivity Analysis of Results**



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The Virtual Proving Ground Focus

- **Re-Engineer the Army's Test Capability in Support of Acquisition Streamlining Using a Comprehensive Interrelated set of Synthetic Environments and Stimuli Which will Confirm a System's Readiness and Technical Maturity, from Concept Through Fielding, and With a Substantial Reduction in Program Resources.**

Embrace The Virtual!



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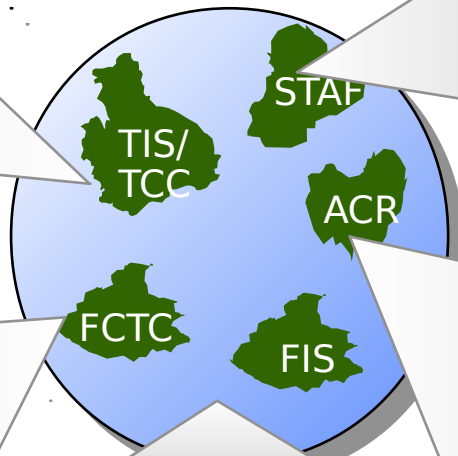
The World of VPG



Micro-TIS

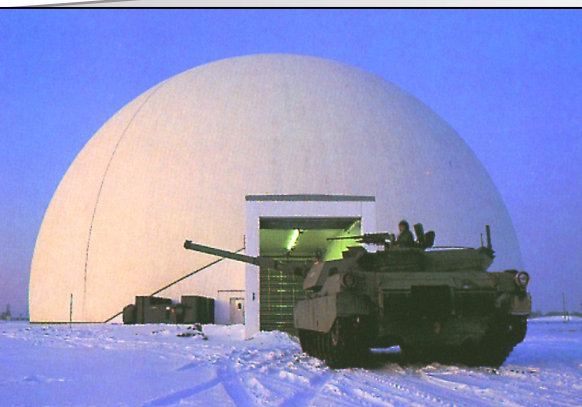
Test Item Stimulator/Test Control Center

< \$1M Investment
> \$2M Savings on First Test (EPLRS)
Continued use in Other Tests



Simulation/Test Acceptance Facility

< \$6M Investment
> \$8M Annual Savings/Cost Avoidance (LONGBOW)



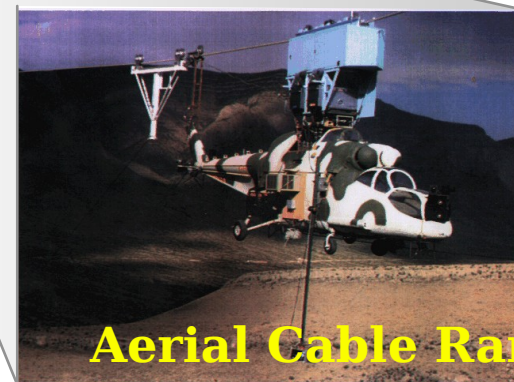
Fire Control Test Complex

\$5M Investment
> \$5M Annual Savings/Cost Avoidance
(M1 Abrams)



Firing Impulse Simulator

< \$7M Investment
> \$23M Cost Avoidance for Trunion Bearing Test



Aerial Cable Range

Aerial Cable Range

< \$36M Investment
> \$14M Cost Avoidance (MAWS) First Time Used
> \$41M Cost Savings/Avoidance to Date

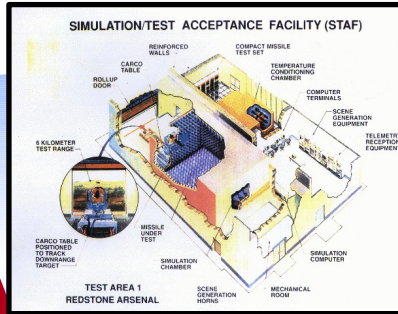
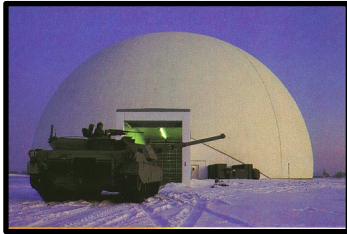
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Virtual Proving Ground

Army Test & Evaluation Command



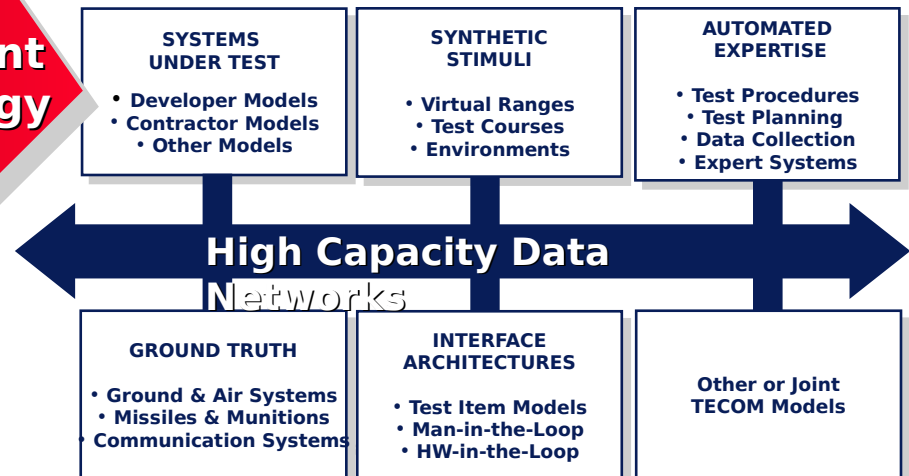
Future

- Cohesive, comprehensive test capability to characterize systems and materiel better and faster
- TECOM virtual testing support throughout the acquisition process Properly scoped hardware testing augmented and extended by virtual testing
- Widely networked T&E resources and “Internet type” customer access

Now

TECOM Commitment & Technology

- Islands of Success
- Synthetic stimuli
- Synthetic test coupled to hardware
- Ground truth provided to developers/designers



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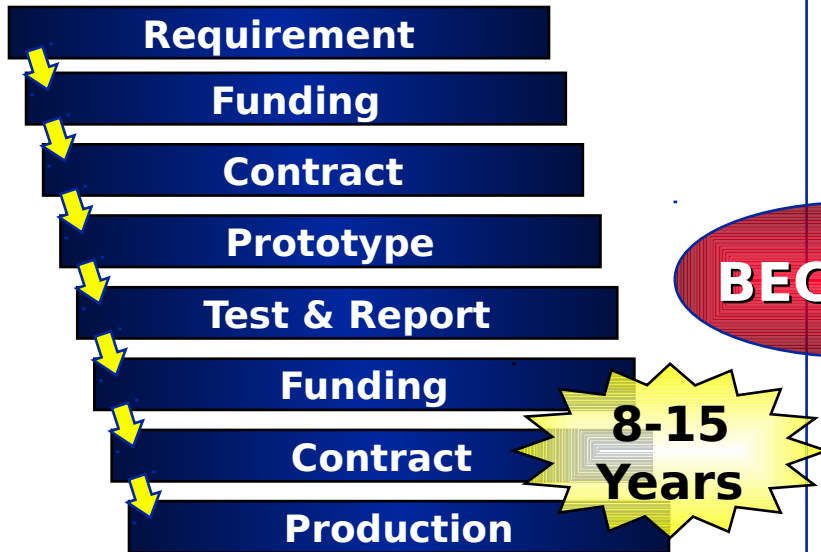
*Facing the
Future...*

Together



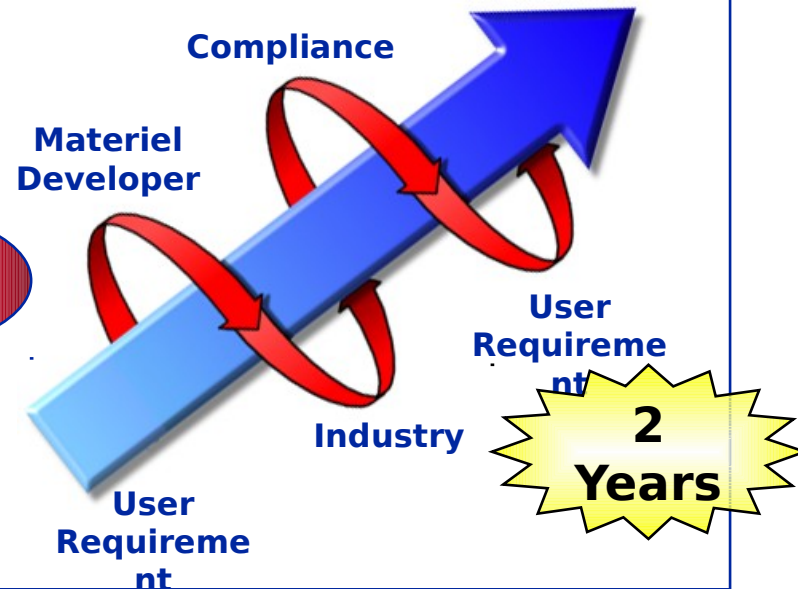
Acquisition Time

Old Linear Process



BECOMES

Spiral Development



- Battle Labs
- Army Warfighter Experiments
- Simulation & Testing

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